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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/612,260	07/07/2000	Guy M. Cohen	YOR9-2000-0174	7116
28211	7590	02/05/2004	EXAMINER	
FREDERICK W. GIBB, III MCGINN & GIBB, PLLC 2568-A RIVA ROAD SUITE 304 ANNAPOLIS, MD 21401			KANG, DONGHEE	
			ART UNIT	PAPER NUMBER
			2811	
DATE MAILED: 02/05/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/612,260	COHEN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Donghee Kang	2811	

-- Th MAILING DATE of this communication appears on th cover sheet with th corr spond nc address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 November 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13, 15-20, 44 and 55 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 44 is/are allowed.
- 6) ☒ Claim(s) 1-13, 15-20 and 55 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4, 7, 8, 11, 18-20 & 55 are rejected under 35 U.S.C. 102(b) as being anticipated by Taur et al. (US 5,646,058).

Re claim 1, Taur et al. teach a transistor comprising (Fig.2):

A channel region; a first gate (30) on top of said channel region; a second gate (34) below said channel region; and source and drain regions laterally adjacent said channel region, where said channel region includes an extension into said source and drain regions.

Re claim 4, Taur et al. teach the transistor further comprising a first gate dielectric below said first gate and a second gate dielectric above said second gate.

Re claim 7, Taur et al. teach said first gate comprises a different thickness than said second gate.

Re claims 8 & 20, Taur et al. teach said first gate, said second gate and said channel region form a planarized structure.

Re claim 11, Taur et al. teach a semiconductor chip having at least one transistor, said transistor comprising:

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A channel region; a first gate on top of said channel region; a second gate below said channel region; a first gate dielectric below said first gate; a second gate dielectric above said second gate; source and drain regions laterally adjacent said channel region; and source and drain dielectric between said source and drain regions and said first gate and said second gate, wherein a thickness and material selection of said first gate dielectric and said second gate dielectric is independent of said source and drain dielectrics.

Re claim 18, Taur et al. teach said first gate and said second gate are electrically separated.

Re claim 19, Taur et al. teach said first gate and said second gate having different thickness.

Re claim 55, Taur et al. teach a transistor comprising (Fig.2) :

A substrate having a crystal orientation; a single crystal channel above said substrate, wherein the crystal orientation of said single crystal channel is independent of said crystal orientation of said substrate; a first gate above said single crystal channel; and a second gate below said single crystal channel.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 2-3 & 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taur et al.

Taur et al. teach substantially the entire claimed structure, applied to claim 1 as explained above, except that the first gate comprising a different doping concentration and doping species than said second gate. It is, however, conventional in the art to select the concentration of gate electrode to adjust a threshold voltage in the transistor. If the first gate electrode has a lower concentration than the second gate electrode, a threshold voltage of the first gate is lower than that of the second gate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed Taur's "first and second gate" having a different concentration, since the different concentration of gate electrode provides the different threshold voltage in device.

5. Claims **5 & 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Taur et al. in view of Uesugi et al. (US 5,708,286).

Taur et al. applies to claim 1 above.

Taur et al. fail to teach the first conductive contact of first gate and second conductive contact of second gate are coplanar. However, Uesugi teaches in Fig.1 & Col.7, lines 42-46 the first conductive contact (80) of first gate (60) and second conductive contact (90) of second gate (30) are coplanar. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Uesugi with Taur's device in order to reduce the manufacturing process.

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6. Claim **6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Taur et al. in view of Pfiester (US 5,166,084).

Taur et al. do not teach the first gate comprising a different material than said second gate. However, Pfiester teaches in Fig.4 the first gate electrode (24) comprising a different material than said second gate electrode (26). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Pfiester into Taur's device, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

7. Claim **9, 10 & 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Taur et al. in view of Yamanaka (US 5,834,797).

Taur et al. do not teach the first gate dielectric comprising a different thickness than said second gate dielectric. Yamanaka teaches said first gate dielectric comprises a different material than said second gate dielectric. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Yamanaka into Taur's device, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

***Allowable Subject Matter***

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8. Claim 44 is allowed.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Maxiflex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on 703-308-1690. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Donghee Kang  
Examiner  
Art Unit 2811

dhk